JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS

EDITOR-IN-CHIEF
J. R. WILLIS
Bath University
School of Mathematics

Volume 38 (1990)

Title Section, Volume Contents and Author Index

PERGAMON PRESS
OXFORD · NEW YORK
BEIJING · FRANKFURT · SÃO PAULO · SEOUL · SYDNEY · TOKYO

JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS

Editor-in-Chief
J. R. WILLIS

School of Mathematical Sciences, University of Bath,
Claverton Down, Bath BA2 7AY, U.K.

Editorial Advisers

R. HILL (Editor-in-Chief 1952–68)—Cambridge

P. CHADWICK—East Anglia R. J. CLIFTON—Providence
K. L. JOHNSON—Cambridge J. W. HUTCHINSON—Cambridge (MA)
J. R. RICE—Cambridge (MA)

Publishing offices: Headington Hill Hall, Oxford OX3 0BW, U.K. (Oxford 794141)

Annual Subscription Rates. 1990 *(including postage and insurance)*

Annual institutional subscription rate (1990) DM 660.00. *2 year institutional rate* (1990/91) DM 1254.00.
Personal subscription rate for those whose library subscribes at the regular rate (1990) DM 189.00

Issued six issues per annum. One volume per annum.

Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, U.K.

Microform Subscriptions and Back Issues

Back issues of all previously published volumes, in both hard copy and on microform, are available direct from Pergamon Press offices.

Copyright © 1990 Pergamon Press plc

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

U. S. Copyright Law Applicable Users in the U.S.A.

Photocopying information for users in the U.S.A. The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.
Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale. Specific written permission must be obtained from the publisher for such copying.
☕ The text paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48–1984.

The Item-Fee Code for this publication is: 0022-5096/90 $3.00 + 0.00

CONTENTS OF VOLUME 38

Number 1

I. F. Collins	1	Plane strain characteristics theory for soils and granular materials with density dependent yield criteria
N. P. Kruyt	27	An analysis of the generalized double-sliding models for cohesionless granular materials
J. O. Chung, Jin Yu and S. H. Hong	37	Steady-state creep crack growth by continually nucleating cavities
R. L. Weaver	55	Diffusivity of ultrasound in polycrystals
W. W. Gerberich, D. L. Davidson and M. Kaczorowski	87	Experimental and theoretical strain distributions for stationary and growing cracks
W. Kreher	115	Residual stresses and stored elastic energy of composites and polycrystals
Corrigendum	129	
Announcement	131	International Centre for Mechanical Sciences, Preliminary Programme 1990

Number 2

J. Pan	133	Asymptotic analysis of a crack in a power-law material under combined in-plane and out-of-plane shear loading conditions
J. Pan and C. F. Shih	161	Elastic–plastic analysis of combined mode I and III crack-tip fields under small-scale yielding conditions
Quanxin Guo and L. M. Keer	183	A crack at the interface of two power-law hardening materials—antiplane case

S. Aoki, K. Kishimoto, T. Yoshida, M. Sakata and H. A. Richard — 195 Elastic–plastic fracture behavior of an aluminum alloy under mixed mode loading

R. A. Schapery — 215 A theory of mechanical behavior of elastic media with growing damage and other changes in structure

Li Yingzhi and D. A. Hills — 255 The analysis of three-dimensional cracks generated by sharp indentation

L. M. Brock and J.-S. Wu — 273 An equation of motion for the emission of accelerating dislocations from a crack

Announcement — 287 I.U.T.A.M. 18th International Congress of Theoretical and Applied Mechanics

Number 3

A. Needleman — 289 An analysis of tensile decohesion along an interface

H. R. Schwietert and P. S. Steif — 325 A theory for the ultimate strength of a brittle-matrix composite

R. Abeyaratne and J. K. Knowles — 345 On the driving traction acting on a surface of strain discontinuity in a continuum

G. Goleniewski — 361 Quasi-static crack growth in viscoelastic materials

R. M. Christensen — 379 A critical evaluation for a class of micro-mechanics models

R. Hill — 405 Constitutive modelling of orthotropic plasticity in sheet metals

G. J. Weng — 419 The overall elastoplastic stress–strain relations of dual-phase metals

Number 4

A. F. Bower and M. Ortiz — 443 Solution of three-dimensional crack problems by a finite perturbation method

X. Markenscoff and L. Ni — 481 — The singular nature of the stress field near an arbitrarily moving dislocation loop

G. Alpa and L. Gambarotta — 491 — Probabilistic failure criterion for cohesionless frictional materials

T. C. T. Ting — 505 — Interface cracks in anisotropic bimaterials

T. W. Wright — 515 — Approximate analysis for the formation of adiabatic shear bands

P. Gudmundson — 531 — Anisotropic microcrack nucleation in brittle materials

W. J. Drugan and Y. Shen — 553 — Finite deformation analysis of restrictions on moving strong discontinuity surfaces in elastic–plastic materials: quasi-static and dynamic deformations

M. B. Ruggles and E. Krempl — 575 — The interaction of cyclic hardening and ratchetting for AISI type 304 stainless steel at room temperature—I. Experiments

E. Krempl and M. B. Ruggles — 587 — The interaction of cyclic hardening and ratchetting for AISI type 304 stainless steel at room temperature—II. Modeling with the viscoplasticity theory based on overstress

Call for Papers — 599 — Joint ICF/FEFG International Conference on Fracture of Engineering Materials and Structures

Number 5

M. J. Worswick and R. J. Pick — 601 — Void growth and constitutive softening in a periodically voided solid

J. C. Moosbrugger and D. L. McDowell — 627 — A rate-dependent bounding surface model with a generalized image point for cyclic nonproportional viscoplasticity

L. B. Freund — 657 — The driving force for glide of a threading dislocation in a strained epitaxial layer on a substrate

P. M. ANDERSON, N. A. FLECK and K. L. JOHNSON 681 Localization of plastic deformation in shear due to microcracks

D. M. PARKS and S. AHZI 701 Polycrystalline plastic deformation and texture evolution for crystals lacking five independent slip systems

W. YANG 725 On the spatial characterization of damage evolution by a one-dimensional model

Announcements 741

Number 6

H. Y. YU, S. C. SANDAY and B. B. RATH 745 The effect of substrate on the elastic properties of films determined by the indentation test—axisymmetric Boussinesq problem

E. M. KOPALINSKY, P. L. B. OXLEY and H. T. YOUNG 765 A strain-hardening slipline field analysis of the plastic deformation observed in a model asperity interaction experiment

T. NAKAMURA and D. M. PARKS 787 Three-dimensional crack front fields in a thin ductile plate

C. HUET 813 Application of variational concepts to size effects in elastic heterogeneous bodies

QUANXIN GUO and I. M. KEER 843 A crack at the interface between an elastic–perfectly plastic solid and a rigid substrate

R. C. BATRA and C. H. KIM 859 Effect of viscoplastic flow rules on the initiation and growth of shear bands at high strain rates

K.-T. CHAU and J. W. RUDNICKI 875 Bifurcations of compressible pressure-sensitive materials in plane strain tension and compression

Erratum 899

Announcements 901